Report to

WA State Office of Financial Management

Grants, Contracts and Loans Feasibility Study

Conceptual Design

Washington State *Roadmap*

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Date: March 30, 2006

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APPENDIX A. REVISION LOG

1. INTRODUCTION

1.1. Purpose

The purpose of the Grants, Contracts and Loans Management (GCLM) Conceptual Design document is to describe, to the extent feasible, an anticipated design of the recommended solution. Because the recommended solution is a Best-of-Breed software application, which has not yet been selected, the design can only be addressed generically and at a high level.

The designs described in this document are meant to aid the selection process for a Best-of-Breed product by describing how a software product is likely to meet the requirements described in the Definition of Requirements.

Functional requirements are addressed in the section on User Experience Design. The primary logical system component described in the Business Case document is broken down further into a description of the components that are likely to be present in any Best-of-Breed candidate application. This design is meant to help prepare project stakeholders to evaluate vendors' solutions against functional requirements.

Non-functional requirements are addressed at an abstract level in the Architecture section. Because all candidate applications will be designed differently, this design is meant to be a high-level composite standard against which to evaluate application architectures.

1.2. Background

The Washington State Department of Ecology must replace its aged Contracts & Grants Management System that processed transactions totaling $392 million in the 2003-2005 biennium. OFM has proposed that Ecology's replacement be directed into an enterprise system for Washington State to be used by multiple agencies for grants, contracts, and loans management. Benefits are avoidance of duplicative systems costs among agencies, cross-agency monitoring of projects, and improvement of core business practices. OFM is leading the effort, joined by the Departments of Ecology (ECY) and Community, Trade and Economic Development (CTED) as the first customers of the new system. An enterprise system is also mission-critical to CTED; it distributes over $1.2 billion in new and existing contracts and loans through manual procedures and spreadsheets and seeks improved business practices and information systems.

Monies spent toward such systems provide a unique opportunity to address not only ECY's and CTED's needs but also achieve:

- Avoidance of duplicative system' costs among agencies.
- Improved monitoring of projects. Agencies with programs for environmental quality could share project information, as recommended in the 2001 report by the Joint Legislative Audit and Review Committee, "Investing in the Environment: Environmental Quality Grant & Loan Programs Performance Audit."
- Improved management of many types of contracts and of loans.
- Automated fiscal processes to achieve efficiencies in the payment, receipt and accounting for funds.
- Electronic access to those applying for grants, requesting payments, or seeking information.

The Proposed System will be a *Roadmap* Business Initiative. The *Roadmap* is a multi-year effort to improve and integrate the state's financial and administrative processes and information systems (More information is available at http://www.OFM.WA.GOV/Roadmap). As a *Roadmap* business initiative, this Enterprise Grants, Contracts & Loans Management System will be an early adopter of three key *Roadmap* approaches:

- **Business process modeling**. Business process modeling is being conducted to document the "as-is" business processes and the "could-be" future model. The "could-be" model will serve as a starting point for the feasibility study and will represent a common understanding of the best practices to be implemented by the State. The "could-be" model will also identify key policy changes that may be necessary, key common information requirements, and establish the value proposition that can be achieved. The "could-be" models related to grants, contracts and loans management are recently available.
- **Integration architecture**. A common integration architecture for the State's financial and administrative systems is being developed under the authority of the state's Enterprise Architecture committee. This architecture will consist of principles, policies, reference models and standards. The integration architecture will be designed to address the following questions:
  - What is the technical architecture that will allow core financial and administrative systems and business processes to be implemented incrementally with confidence that all of the pieces will fit together as they come on-line?
  - What are the clear and consistent guidelines for central systems providers and line agencies that allow core financial and administrative systems to fit within the State's current environment of common and agency "shadow systems"?
  - How can financial and administrative systems be constructed to allow business process solutions to be composed of agency unique and central, common components?

This architecture will be under development at the time of the feasibility study. The feasibility study will take into account the integration architecture direction and requirements as known at that time.

Performance measurement. *Roadmap* business initiatives provide the opportunity to apply Government Management Accountability and Performance principles to the state's "back office" business processes. The performance indicators for grants, contracts and loans management will be available in early January 2006 as part of the business process modeling described above.

This feasibility study will allow OFM, ECY and CTED to plan for an enterprise solution for grants, contracts and loans management (within the scope of this project) by documenting:

- The requirements for an enterprise grants, contracts and loans solution
- The business case for proceeding with such a solution
- The alternatives – and costs and benefits – for a solution and a recommended solution

And, for the recommended solution:

- A conceptual design
- A work plan
- A risk management plan

The first three documents have been completed and their content approved, including the recommendation of proceeding with a Best-of-Breed solution. This document describes the conceptual design of a generic Best-of-Breed application to meet the project's requirements.

1.3. Approach

The Project Steering Committee has accepted the recommendation to detail the Best-of-Breed solution alternative. Because a product has not been selected, the team approached the conceptual user design from a generic, what-to-expect perspective and the conceptual architecture from a generic, what-to-look-for perspective.

User Design or Experience

Realizing that different types of users' experiences will be different, we divided the users into groups and listed the use cases each group is likely to experience. Building on the logical components identified in the Business Case document, we described the Operations/Sub-Grants Management component further including the entities – or likely application features – that must be present and must interact with each other.

Architecture

Because each Best-of-Breed product will have its architecture already in place, the extent of useful documentation on application architecture is the desirable division of physical components

to meet State enterprise and operational standards. To that end, we have included a diagram and description of compliant architecture.

Data

Considering enterprise data needs and the wide variation in sub-grant data, we have described ways an application can accommodate agreement data needs.

1.4. Sources

Sources for information in this document include:

CMS Software Requirements Specifications, CTED, June 2005: contracted study with seven appendices, summarizing findings on the requirements for a contract management system for CTED.
CMS Housing Trust Fund Storyboard, CTED, November 2005: contracted study with requirements for the Housing Division, including sample screen designs.
Contracts, Grants and Loans Project Preliminary Requirements Analysis, ECY June, 2005: contracted study with future process flows and high level requirements.
Roadmap publications on the website at: http://www.ofm.wa.gov/roadmap/default.htm. Documents include Grant Management Value Proposition, version 0.6, February, 2006: a description of the "to be" processes for grants and loans and the potential value in harmonizing common business processes.
Washington State Enterprise Architecture Program Integration Architecture Initiative Charter, EA Committee Document version 1.3, December, 2005: Description of issues to be addressed by the statewide enterprise architecture initiative, a list of the Documenter Team, and initiative timeline.
All previous deliverables of this project.
Communications with ECY, CTED and OFM stakeholders on system features and needs.
Industry research conducted through National Grants Management Association (NGMA), www.ngma-grants.org The National Grants Partnership (NGP), www.thengp.org Grants.Gov, www.fedgrants.gov Forrester Research, Inc, www.forrester.com The Gartner Group, www.gartner.com Information Age Associates, www.iaa.com
Berk & Associates Inventory and Evaluation of the State's Public Infrastructure Programs and Funds report dated December 16, 2005
JLARC Investing in the Environment: Environment Quality Grant & Loan Programs Performance Audit, Report 01-01 dated January 22, 2001

1.5. Relationship to Other Deliverables

The Conceptual Design document is made possible by work done in developing the Definition of Requirements, Emerging Business Case and Preliminary Recommendation, and Alternatives Analysis and Recommendation documents. This document follows up on the accepted recommendation and, in turn, will be built upon in all subsequent documents:

- The Work Plan will lay out the steps likely to be needed to implement the recommended solution and the issues and our recommended approach to them.
- The Risk Plan will document the risks in implementing the selected solution in a risk management plan that includes the risk type, likelihood, impact and exposure as well as strategies for avoidance, mitigation and control.

2. RECOMMENDED SOLUTION CONCEPTUAL USER EXPERIENCE DESIGN

2.1. Different User Experiences

There are several different types of expected users of a new agreement management system. The 32 different system "interactors", or actors, identified during requirements gathering may be grouped by their expected user experience. These groups are:

1. Applicants / Recipients / Funders / the Public
2. Agency Program / Fiscal / Contract Staff
3. Agency System Administrators
4. Enterprise Stakeholders
5. Enterprise System Administrators

A chart mapping the system actors to these groups is below.

External / Public	Agency Program / Fiscal / Contract	Agency Administrator	Enterprise Stakeholder	Enterprise Administrator
•Applicant •Respondent •Recipient: Submitter •Recipient: Signer •Contractor •Loan Recipient •Agreement Funder •Application Evaluator	•Evaluation Coordinator •Application Evaluator •Agreement Signer/Approver •Program Manager •Program Assistant •Program Officer •Project Manager •Inspector •Auditor •Contract Manager •Contract Assistant •Contract Officer •Budget Officer •Fiscal Manager •Fiscal Assistant •Fiscal Officer •Agency Performance Manager	•Agency System Administrator	•Enterprise Performance Manager •Other Enterprise Stakeholder	•Enterprise System Administrator

2.2. Meeting Roadmap Recommendations

The Roadmap Grants Management Value Proposition document lists recommendations to improve the value of the grants management processes across the State. Included are recommendations to:

1. Adopt enterprise-wide standards (as feasible) for terminology, application forms, progress reports and payment requests.
2. Establish an enterprise-wide standard for registering and identifying applicants and recipients.
3. Facilitate use of electronic documents and signatures.
4. Adopt risk-based and business-rule-driven approach for workflow routing of progress reports, payment requests and inspection triggers.
5. Look for opportunities to standardize performance measures.
6. Use information to improve program service delivery.
7. Adopt federal grant management standards statewide as they become available.
8. Establish an enterprise grants management system, integrated with state financial systems, for grant managers.
9. Create an enterprise grant recipient web portal.

These recommendations speak to a collaboration of enterprise and agency effort in designing forms and workflow, in setting up agreements and in making information available. It is critical that both enterprise and agency users “play with the same deck” in day-to-day agreement management and in reporting and use of agreement information.

Keeping that requirement in mind, we have mapped the groups of users above to the set of system functions, or use cases, they can be expected to use. A chart mapping the user groups to the functional use cases is below.

External / Public	Agency Program / Fiscal / Contract	Agency Administrator	Enterprise Stakeholder	Enterprise Administrator
•Register to Apply •Apply •Evaluate Application* •Report Progress •Request Payment •Request Info •Report to Funder •Make Info Available •Get Help •Sign on *Evaluators may be external	•Advertise •Publish Application •Set Evaluation Workflow •Evaluate Application •Award Decision •Set Up Agreement •Set Up Schedule •Set Up Budget •Set Agreement Workflow •Amend •Monitor •Track Deliverables •Report to Funder •Request Information •Proc Payment Request •Proc Financial Adjustment •Evaluate/Inspect/Audit •Close Out •Track Outcomes •Send To/From AFRS •Make Info Available •Get Help •Sign On	•Control Access •Update Tables •Recipient / Vendor Tables •Request Information •Get Help •Sign On •Publish Application* •Set Evaluation Workflow* •Set Up Agreement* •Set Agreement Workflow* •Send To/From AFRS+ •Make Info Available+ *Advise on Set Up + As Needed	•Request Info •Get Help •Sign On	•Control Access •Update Tables •Add Agency •Recipient/ Vendor Tables •Request Information •Get Help •Sign On •Publish Application* •Set Evaluation Workflow* •Set Up Agreement* •Set Agreement Workflow* •Send To/From AFRS+ •Make Info Available+ *Advise on Set Up + As Needed

The list above reflects the need for collaboration of agency and enterprise stakeholders to establish and adopt standards as much as possible, while still meeting the needs of program funders.

2.3. Expected User Experiences

Some of the user needs above will be met by interfaces with systems already in place at the State. Examples are the processing of financial transactions by AFRS and enterprise reporting using Business Objects. This division becomes more clear by returning to the logical system component model introduced in the Business Case document and modified to add communication with other state enterprise systems. Logically, the Best-of-Breed application will provide the functionality in the Operations (Sub-Grants) Management circle in the diagram below.

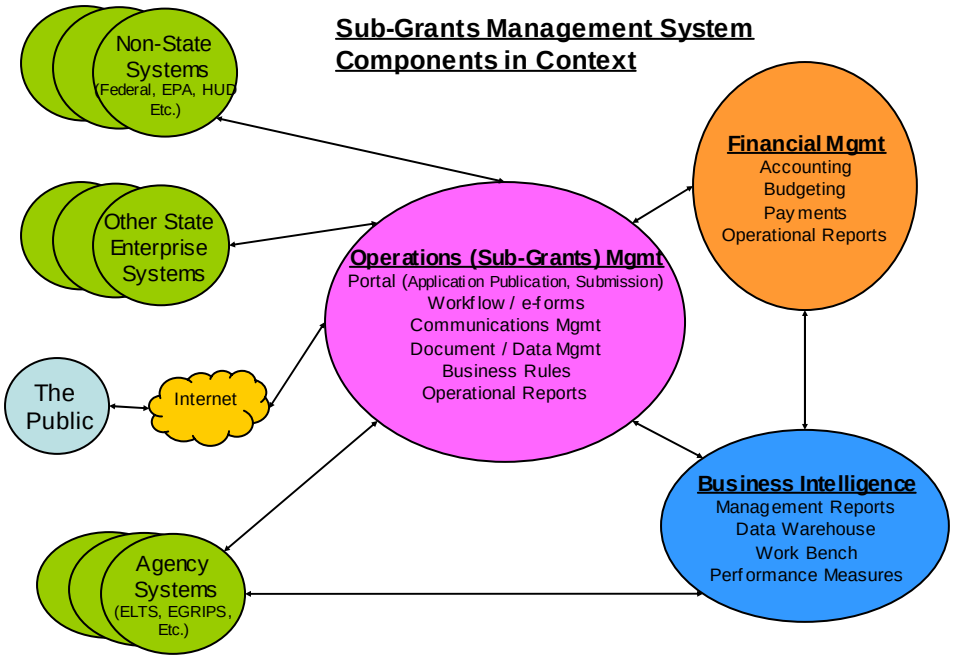


Figure 1 – Logical System Components

Concentrating on the Operations Management circle above, we provide here a high-level description of how an ideal Best-of-Breed sub-grants management system might operate. It will be described in two stages:

- The setup and configuration, expected to be used by agency program users, assisted by system administrators at both the agency and enterprise level.
- The operation, expected to be used by agency and external users.

This is not meant to be interpreted as a specific software product but rather a mixture of features and functions of a number of leading packages available for use today. Not all features will be included here but the overall conceptual design should allow for any missing features to be accommodated in the structure.

2.3.1. Setup and Configuration

2.3.1.1. ORGANIZATIONS

The sub-grant environment in the State of Washington involves a large number of state agencies as well as participation from other non-state organizations. Each of these agencies and

organizations should be recognized as such within the system and each may have their own unique business requirements with respect to their involvement in the sub-grant process. The system will need to be able to register/setup each of these entities and have sufficient attributes that accommodate the majority of their variations.

The recognition of unique agency requirements is an important consideration in the evaluation of a package. The software should anticipate as much as possible this fact and have some method to accommodate it in its design. For instance a business rule may be established at the agency level and apply to all transactions in the agency. Divisions and departments within that agency may have their own unique business rules that apply only to their area, in addition to the agency wide business rules. And this may occur in each different agency as well as at the State enterprise level.

2.3.2. Users

Each agency and organization set up in the system will need to have users set up to act on behalf of the entity. Organizations establish the agencies and their sub-divisions and users facilitate the handling of information for organizations. User information within the system should address all of the data that may be needed in the sub-grant process for both State and external/public users. User information should include items like organization, address, telephone, email, role, etc.

Every user should be associated with a profile that provides access to the functions and information that they require in order to perform their responsibilities. For instance, a reviewer's profile will provide authority and access to assigned applications for evaluations and other features that are required to support that activity. A program manager will need access to more features and more information than the reviewer. The program manager will also have authority to approve sub-grant awards, report on program wide sub-grant activity and modify sub-grant information.

2.3.3. Programs

Each sub-grant program must be described to the system in some fashion. In addition to a short name and longer textual description other information will be required such as funding source, funding amount, restrictions, eligibility requirements, financial coding, grantor reporting requirements, etc. This information facilitates tracking and reporting within the system.

2.3.4. Documents/Forms

One of the major benefits of automating the sub-grants management process is to reduce paper-based work. Every document that is currently handled manually should be considered for inclusion in the new system. Documents that cannot be handled within the system should be imaged as early as possible and managed as an attachment within the system. Putting as many

documents as possible into electronic format will deliver significant productivity benefits in addition to improved tracking and reporting.

The document management component of the system should be flexible and adaptable. It should allow for the design of existing documents with the ability to capture all of the data currently in the manual forms, as well as data on new forms, enterprise data and other data that may be required for later processing or reporting. Once designed, the document should display on the screen as an identical copy of the manual form. This will reduce issues between manual paper-based documents and their automated electronic equivalents.

Standard documents should be designed that are considered template or default forms. These should be appropriate for agencies' use for all "standard" processes. However, the system must accommodate significant variation – while retaining enterprise items – in formats and data for different agencies and programs to address unique variations. Once these specific documents are designed, an agency should be able to control the use of those forms for specific programs within their agency.

Business rules need to be incorporated into the documents. Simple rules that require specific information to be entered should be easily controlled by the user. These types of checks would include date validation, numeric/alphabetic validation, checking values against a list and similar field level constraints. The next level of business rules involves cross-checking data with data elsewhere on the document or in the system. And the most sophisticated level of business rules includes stringing conditions together with the ability to branch to other rules. Most sub-grant management systems won't have user controlled facilities for these. They would be identified beginning with the assessment phase through implementation and would require some customization and/or configuration.

The end result of document design should be standard, "statewide approved" forms that are available for any agency to use for specific programs, and "agency specific" forms that incorporate any mandatory statewide requirements and extensions to address their own unique needs. Documents should be available to agencies in a hierarchical fashion. The statewide documents should be available for all agencies unless they have created their own revised document to replace it. A division within an agency should have access to state-wide and agency documents unless they have created specific documents to replace it. In that way each document is created once and set up within the hierarchy and applies to all organizations under it. The diagram below illustrates the nature of the organizational hierarchy showing agencies, divisions and departments, users and the availability of documents. If a division has no specific documents, it looks to the agency for them; if the agency has none, it looks to the statewide documents.

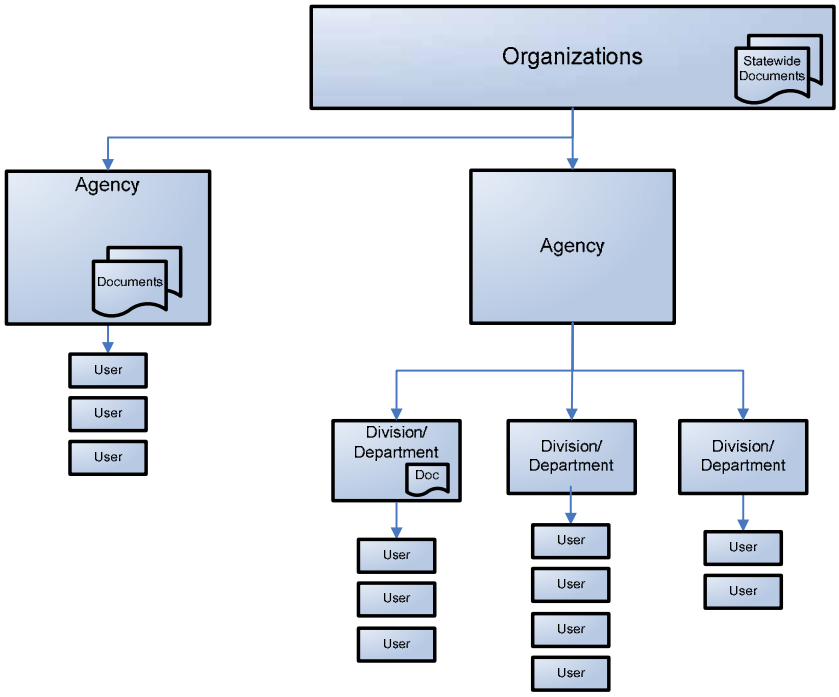


Figure 2 - Organizational Hierarchy

2.3.5. Workflow

Once the organizations, users and documents are set up, they all come together in workflow. Generally speaking, workflow is the automation of having users move documents through workflow steps for an organization. Workflow steps are individual gates that a document may be required to pass through. They typically include check, issue, review, approve, etc. Workflow steps may be mandatory and cannot be bypassed or optional, which lets the user decide if it is appropriate.

Workflow, like documents, must be able to adapt to agency unique requirements. Although there may be certain statewide workflow steps that every document must pass through, it is typical for each agency to have its own individual steps. The system must allow for this flexibility.

2.3.6. Tying It All Together

In order to complete the setup for an agency, all of the above must be completed. Organization information and sub-organization detail must be specified, users within those organizations and sub-organizations must be set up, documents must be created for each organization to use and

workflow steps must be specified for those documents. The last step is to let the system know who is authorized to perform each step for each document.

Workflow authorization may be based on dollar thresholds. For instance, an administrator may be able to approve sub-grants up to $5,000, but the manager must approve anything over that. So the profile for the administrator must have $5,000 set up in their profile for sub-grants approval. When a sub-grant comes along that is over $5,000, the administrator does not show up in the workflow, only the manager.

The diagram below illustrates an applicant (bottom of diagram) completing different documents over the internet, which appear in users' "in baskets" for attention. They process documents and send them to the next step such as evaluation or manager review, and so on.

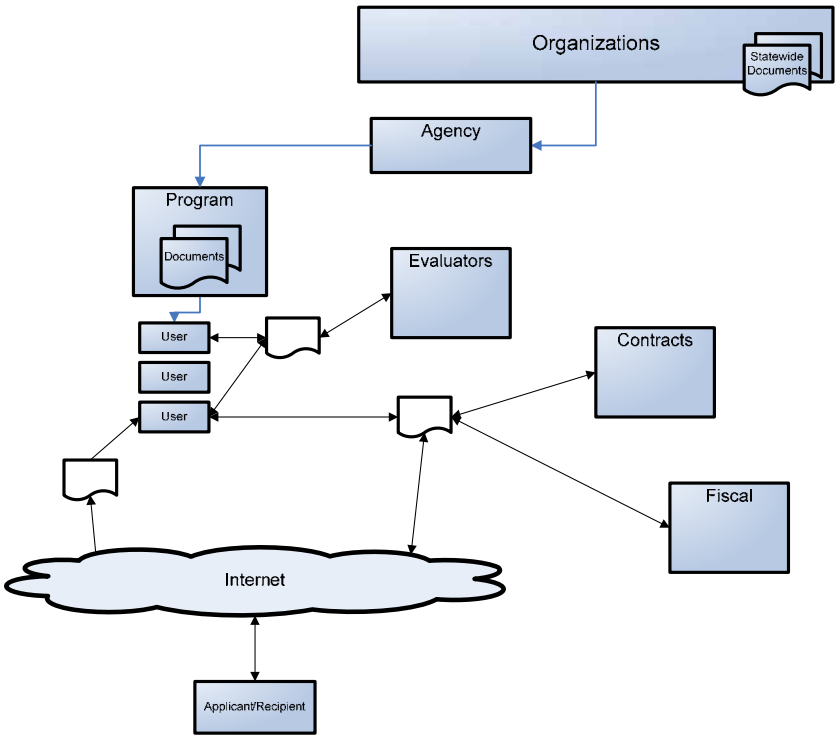


Figure 3 – Workflow

2.3.7. Application Administration

The majority of the effort above is the domain of the enterprise and/or agency application administrator. The administrator manages the system setup and configuration settings. The more flexible the application the more important this role becomes. The application administrator must

have knowledge of the business processes, regulations, policies and system functions and settings. The administrator would work with staff and management to understand the requirements of the business and their implementation into the application. This could include the creation of new reports and forms, changes to table values, addition of new data elements and settings controlling the operations of the application.

2.4. Agreement Operations

2.4.1. Public Participation

The ability of a sub-grant program to reach the right audience is a significant success factor. This is sometimes accomplished through direct targeted practices such as manually developed email distribution lists, fax lists and mail lists. Additionally, using an internet web site to advertise sub-grants provides a more indirect method of providing information. In the latter case one can never be sure that the desired audience has received the information.

Automated systems must provide the best use of both techniques. Sub-grant information must be made available to the public on the internet with minimal effort by the user. Once all the pertinent information has been set up on the system, the user should be able to select a publication format and have it automatically released to the website.

Individuals interested in applying for a sub-grant should have the ability to register with an agency, or multiple agencies. The system could provide them with the ability to specify a profile of interest that includes which grants, program areas, location, etc. That could allow automated email notification when new sub-grants are published that meet their profile of interest. Additionally, the State user should be able to advertise sub-grants to individuals using a distribution list or using broadcast email to notify all registered grantees. Proactive notification should significantly increase awareness of sub-grant opportunities.

Once an individual has located a sub-grant program that they wish to participate in, the sub-grant application should be available on the internet as an electronic form. Some applications can provide eligibility quizzes to reduce the chance of later rejections. If eligible, they would enter all of the requested information and the e-form would validate that the information is in the expected format, i.e., dates, coded values, zip codes, etc. Attachments could be electronically attached to the application. Additionally, the e-form should be able to accommodate business rules that provide a higher level of overall data integrity. They would have the ability to leave their application in a draft format and return at a later time to continue. Once satisfied with the application they would submit it for agency consideration. Once the application is submitted, the individual should have a means of monitoring the status of the application as it progresses through the review and evaluation process.

2.4.2. Application Evaluation and Award

Each submitted application must be reviewed and processed in a timely fashion. Once an application arrives, an appropriate authorized user should be automatically notified by the system using email. The user would typically conduct an initial review of the application and determine if it meets all requirements for further processing. If the application is deficient in some manner, the user should be able to notify the applicant and either hold the application pending further information or return the application for the applicant's attention. Applications ready for evaluation will be sent to the next workflow step that is specified for that document. That can include background check, peer review, program manager approval, outside evaluation, etc.

Sub-grant programs vary in the method and timing of evaluation. In some cases sub-grants are formula driven and evaluated on a case by case basis. In other cases sub-grants are competitive and will be evaluated in a group. Both methods must be automated by the system for timely turnaround. Common evaluation techniques should be available to the program coordinator to specify for each program. These techniques should anticipate and automate the reviewing, analysis, evaluator commenting, scoring and ranking of applications.

Applications will proceed to an award decision following evaluation. Whether the application is accepted, rejected, deferred or some other disposition, an email should be automatically sent to the applicant to inform them of the decision. Applications may have additional steps after evaluation that have been specified in the workflow.

Eventually a decision to award the sub-grant is made and an agreement is created between the parties. The draft agreement would be pre-populated with the information from the application and any additional information would be added. The agreement would be electronically routed to the applicant for review and approval and returned to the agency for execution. The final agreement in the system would be linked to all related documentation such as advertisement, applications, evaluation, communications, etc.

2.4.3. Sub-Grant Lifecycle Transactions

During the life of the sub-grant agreement a number of activities have to be managed in an automated fashion in the system. These include:

- Progress reporting
- Inspections
- Payment requests
- Financial transactions
- Budget tracking
- Deliverable tracking

- Outcome tracking
- Agreement amendment
- Closeout processing

A number of these activities can be supported with a calendaring function. This involves the creation of a future dated event for an agreement or project that the system would use to initiate a transaction. The transaction could be an email notice to the appropriate parties that an activity is required, or could actually send a document to a recipient for execution. This could be used to schedule future inspections or file review activities.

Other transactions would be supported by the availability of a form. These forms could be available from a central repository or through a list of forms customized to the agreement in question. This might include a progress report, request for payment, deliverable information and request for final project close out documentation.

The sub-grant agreement is a legal instrument and must be maintained under strict change control. Changes to important areas of the agreement may require formal amendments, legal review, recipient approval and authenticated signatures. The system must be able to track these changes to the agreement and provide a full audit trail of all changes.

Financial transactions are a critical aspect of maintaining control over the budget awarded and disbursed under sub-grant agreements. This involves keeping the sub-grants system in sync with State financial systems. Grant packages typically do not anticipate specific financial systems but they should anticipate the need to interface with them and that interface, although still requiring some customization, should not be burdensome or expensive.

The system would also anticipate that special circumstances prevail around the closing out of a sub-grant agreement. In addition to the legal expectations that the recipient performed their required obligations under the agreement, there are final assessments of deliverables, outcomes and performance that must be documented, clearing all pending activities and releasing any funds that may not have been expended under the agreement. A number of these requirements would be implemented as business rules for an agency and would be invoked at a predetermined date or upon user initiation.

2.4.4. Reporting

One of the major benefits of an automated sub-grants management system is the integration of the data captured and the ability to report on it. The setup and configuration of the system must anticipate all the operational and management reports that are necessary and desirable from the system. Ensuring that all reporting requirements are identified will ensure that all the data necessary to produce those reports will be captured at the source. Missing data will quickly erode the value of reporting.

The value of reporting is two-fold. The use of standard and customized reports is essential in the day-to-day management of sub-grants. Reports are necessary to stay abreast of the volume and value of activity and prevent bottlenecks and difficult situations. These include activity exception reports, status reports, financial reports, etc.

The other major area of benefit is reporting on the aggregation of all the data. Rising above the day-to-day management focus and looking across the complete program or agency provides the chance to see opportunities that are otherwise hidden in the details. Such reports could be used for program analysis, geographic analysis, performance, statistics, etc. The Business Objects enterprise reporting component already implemented at OFM will also provide significant capability.

3. RECOMMENDED SOLUTION CONCEPTUAL ARCHITECTURE

The architectural requirements for a solution are described in the Definition of Requirements document under Non-Functional Requirements. They included:

- Operating Environment
- External Interfaces
- Availability
- Performance
- Quality
- Maintainability and Support
- Statewide Enterprise Architecture
- Documentation
- Security
- Accessibility
- Implementation
- Conversion

In this section we present the desirable component architecture to meet these non-functional requirements.

3.1. "N"-Tier Architecture

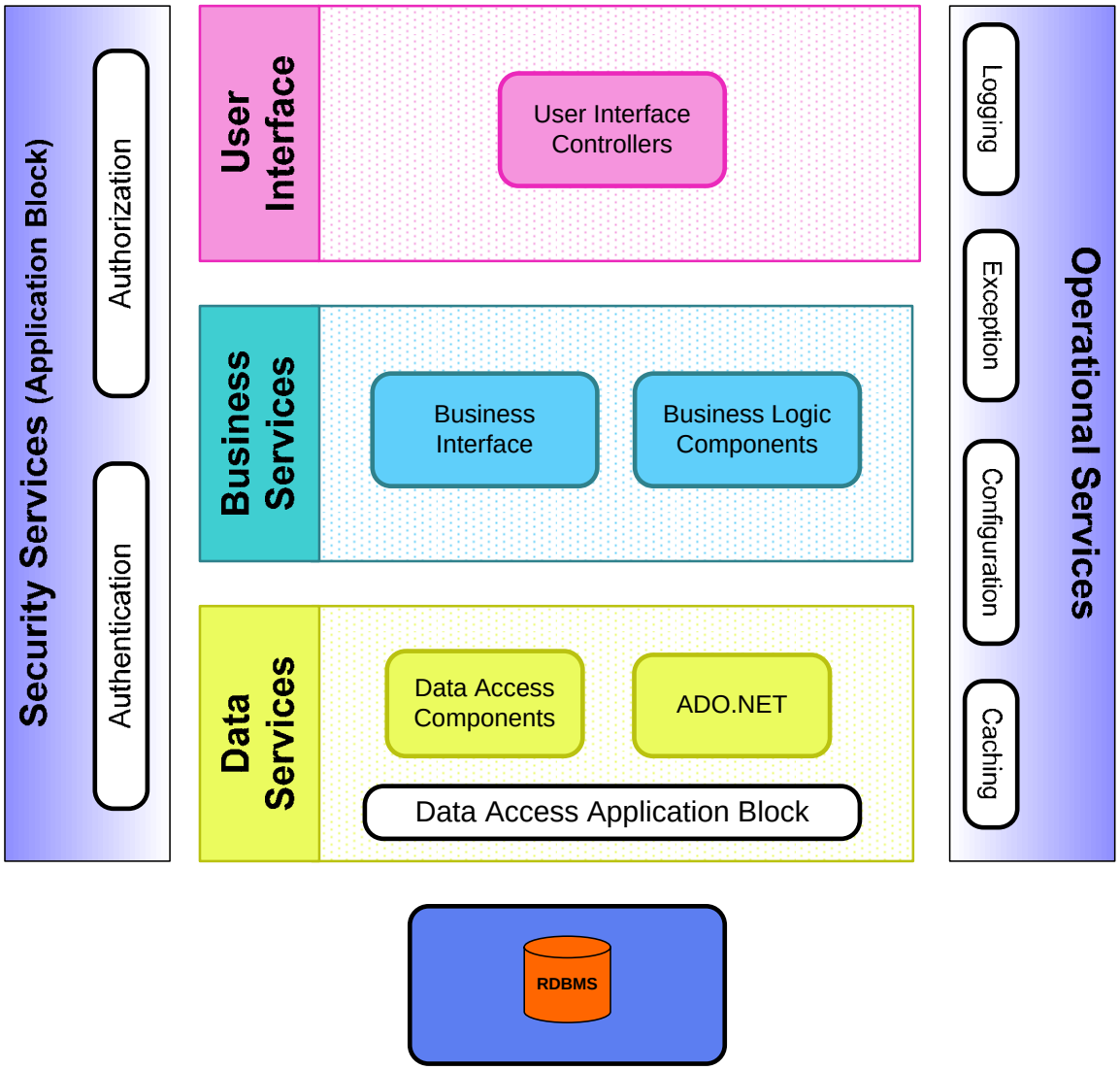
The contract, grants, and loan management solution should employ a common "n"-tier, which will likely be a 3-tier architecture that separates the application into 3 physical tiers (and 3 logical layers discussed later in the document).

1. The Client Tier is the actual client workstations where the users use a Web Browser such as Microsoft Internet Explorer or a thin client as the host to interact with the application.
2. The Application Tier hosts the web and application server components. The web server receives requests from the client tier and processes the request.
3. The Data Tier hosts the database that is required for the application to function and store the information accumulated from the users.

3.2. Logical Layers

The solution would be built on a common ”n”-tier layered architecture that logically separates the system. This layering allows the application to be flexible and agile so as changes are necessary it can accommodate them with minimal effort. Changes in one layer may not require a change in any other layer.

The following figure shows the significant components at a high level in the layer they reside.



The Presentation Layer (User Interface) is where the user interface is managed and generated for the application. The Presentation Layer is responsible for:

- Gathering information from the user.
- Sending the user information to the business layer for processing.
- Receiving the results from the business layer processing.
- Presenting the results to the user.
- Manipulating the data in XML form.
- Deciding what to do with behavioral information (i.e., error messages).
- Logging exceptions generated in or bubbled up to the UI layer.

The Business Layer (Business Services) is where most of the work is actually performed for the business application. All requests for data from the Presentation Layer will flow through the Business Layer. Some requests for data do not require any business processing such as list retrieval and will simply pass through this layer to get the data. This layer is responsible for:

- Receiving input from the Presentation Layer to process.
- Interacting with the Data Layer to retrieve the necessary data to fulfill the user requests.
- Processing the requests and sending the results back to the Presentation Layer.
- Ensuring that business processes are followed and all rules necessary applied to the process.
- Raising business validation messages to the caller in case the business process cannot be completed as expected.
- Initiating and maintaining the transaction state of a process through the use of Data Services.

The Data Layer (Data Services) is used to wrap the access to data including the application database and any other external data sources. All requests for data will flow through this layer to add an abstraction from the disparate systems.

This layer is responsible for:

- Managing database connections and interactions.
- Storing and Retrieving data from the database(s).
- DataSet construction for a business function.

4. RECOMMENDED SOLUTION ENTERPRISE DATA STANDARDS

4.1. Enterprise Data

The Roadmap Grant Management recommendations listed in section 2.2 not only call for workflow and forms common across the enterprise, they also call for data common across the enterprise. Enterprise data will be stored and managed separately from program-specific data, at the enterprise level.

To assure that enterprise data is present and correct, there will be a template-level for documents/forms from which new documents/forms may be generated. Templates will contain all required enterprise items. Once on a form, enterprise items will be required and edited.

At this time, enterprise data is expected to include the following candidates listed in the Grant Management Value Proposition, referenced in section 1.4:

- Program – Information about the objectives, functions, tasks and planned results that define the purpose for funding.
- People – Demographic information about individuals and organizations involved with the program.
- GeoSpatial – Information about the location of program related objectives, functions, tasks, planned results, and people.
- Budget – Information about the funding for program related objectives, functions, tasks, planned results, and people.
- Contract – Information about the legal instrument that specifies program and recipient obligations.
- Recipient – Demographic information about the organization or individual receiving budgeted funds to meet the objectives of the program.
- Project – Information about groups of tasks designed to meet certain program objectives and deliver certain planned results.
- Account – Information about the use of program budget for project tasks to meet certain program objectives and deliver certain planned results.

A previous version of the Value Proposition document listed these specific candidates for enterprise data:

- Applicant/Recipient identification number
- Geo-spatial standards

- Performance objectives/measures
- Program outcomes
- Milestones
- Grant Program number
- Grant Agreement number
- Users and roles

4.2. Program-Specific Data

As documented in the Definition of Requirements, the data needs of the different sub-grant programs are widely diverse and dictated by the type of program and the reporting requirements of the funder, usually a federal agency. These diverse sets of data are integral parts of agreement management.

A traditional data model for any one sub-grant program would be large and would potentially contain many data elements with different attributes. It is clear that in order to serve not one, nor even several programs, but hundreds of programs, a traditional data model will not be practical.

Instead, to accommodate hundreds of diverse data needs for hundreds of diverse sub-grant programs, the application will need a different approach to data. This could be built-in table extension features for data that could be configured with a data element name and attributes, allowing the administrator to accomplish the task of implementing some data changes. Another approach would be using a meta-data method that would abstract the creation and management of data such that the administrator could define new data elements to the system and introduce them into documents, screens and reports.

Regardless of how a software product implements and manages its database, a key differentiator will be how easily new data in different formats, including arrays and calculated items, can be added and data structures changed. It is critical that users be allowed to add program-specific items along with their names, formats and edits/properties, and that those items be available in the database and for forms, queries and reports.

5. ASSUMPTIONS

1. There are potential vendors that offer Best-of-Breed product(s) that will adequately address both functional and non-functional system requirements as documented in the Definition of Requirements.
2. The project will select Best-of-Breed product(s) that will adequately address both functional and non-functional system requirements as documented in the Definition of Requirements.
3. The actual technical architecture design is dependent on the selection of appropriate vendor product(s).
4. The actual communication/messaging functionality is dependent on the selection of appropriate vendor product(s).
5. Although a generic User Experience has been presented in this document, the actual user experience is dependent on the selection of a vendor product(s).
6. The project will issue an RFI to learn more about user and architectural design from potential vendors.
7. Further elaboration of conceptual design would impede vendor neutrality.
8. Further elaboration of conceptual design is not practical without the selection of a vendor's product.

Appendix A.Revision Log

Date	Description	Author
March 14, 2006	Draft submitted for review	Tom Babington / Gary Hudson / Carol Baque
March 17-24, 2006	Updated after User Group review: *pp8-10:* change External/Public column in charts *p.11:* change figure 1; p.13: change 1st, 2nd and 4th paragraphs *p.20:* add list of non-functional requirements *p.23:* add section 4 Enterprise Data Standards	Carol Baque
March 30, 2006	Updated after OFM review: *p10:* delete redundant use case under Agency Administrator *pp23-24:* add specific enterprise data recommendations from Value Proposition	Carol Baque